❑ SELECTION OF RUNOFF FILE TIME STEPS AND RECORD TYPES

KCRTS runoff files are provided in both hourly and 15-minute time steps. The 15-minute time series were generated from the original historical hourly precipitation records, which were synthetically disaggregated into 15-minute time steps using 15-minute rainfall records from hydrologically similar gages.

The length of the runoff file records is periodically changed to include new data. As of January 1, 2005, the KCRTS historical record for SeaTac contains 50 years of simulated flow data. Application of the time steps and record types are shown in Table 3.2.2.A below.

TABLE 3.2.2.A SELECTION OF RUNOFF FILE TIME STEPS AND RECORD TYPES

Analysis Type	Hourly Time Steps	15-Minute Time Steps	Runoff File Record Type[1]
Flow Control Analysis			
• Existing Conditions (target release rates)	Required[2]		Reduced or Full Historical
• Developed Conditions (facility inflows)	Acceptable	Acceptable	Reduced or Full Historical
Water Quality Design Flow			
• Preceding Detention (60% 2-year rate)		Required	Reduced or Full Historical
• Following Detention (full 2-year rate)	Acceptable	Acceptable	Reduced or Full Historical
Sand Filter Volume	Acceptable	Acceptable	Reduced or Full Historical
Conveyance/Overflow Features		Required	Reduced or Full Historical
Level 2, 3 Offsite Analyses	Acceptable for volume analysis	Required for peak flow analysis	Reduced or Full Historical
Closed Depression with Severe Flooding Problem[3]	Acceptable	Acceptable	Full Historical

Notes:

(1) The runoff files do not contain a groundwater component. Therefore, KCRTS should be applied with caution where sources of groundwater express themselves as surface runoff, and the program should not be used to determine summer low-flow conditions in a stream. However, most analyses in this manual are of peak flow conditions where the groundwater contribution is usually small.

(2) Hourly time steps are used to determine predeveloped (target) release rates for all projects to provide for consistent control and protection against cumulative increases in peak flows. If 15-minute time steps were used, the predeveloped discharge rates from more quickly responding sites would be higher, and the onsite detention facilities under developed conditions would extend these rates for several hours. This extension of higher flow rates increases the chances that they will occur simultaneously with the peak flows from slower responding sites to create higher overall peaks in the downstream drainage system.

(3) See Section 3.3.6 (p. 3-49).

❑ CATEGORIZATION OF SOIL TYPES AND LAND COVER

The Runoff Files method with KCRTS currently supports eight land use classifications: till forest, till pasture, till grass, outwash forest, outwash pasture, outwash grass, wetland, and impervious. These classifications incorporate both the effects of soil type and land cover. In the SCS method, four different hydrologic soil groups are defined (A, B, C, and D) based on soil type as mapped by the SCS. The SCS also defines hydrologic response for about a dozen different land use or cover types. The SCS method therefore allows the user a considerably greater degree of flexibility in defining land cover and soil types than does KCRTS. However, the flexibility and apparent detail available with the SCS method cannot be supported on the basis of the data used to develop that method. The Runoff Files method minimizes the number of land use classifications, thereby simplifying both the analysis and review of development proposals.

KCRTS Soil Groups

Under KCRTS, three soil groups are currently defined: till, outwash, and wetland.

Till Soils

Till soils are underlain at shallow depths by relatively impermeable glacial till. The principal SCS soil group within King County classified as a till soil is the Alderwood series (SCS hydrological soil group C), which is the most common soil type throughout the western part of the county. The hydrologic response of till soils in an undeveloped, forested state is characterized by relatively slight surface runoff, substantial interflow occurring along the interface between the till soil and the underlying glacial till, and slight groundwater seepage into the glacial till.

Also included in the KCRTS till soil group are bedrock soils, primarily Beausite and Ovall soils, which are underlain by either sandstone or andesite bedrock, and a large group of alluvial soils.

Alluvial soils are found in valley bottoms. These are generally fine-grained and often have a high seasonal water table. There has been relatively little experience in calibrating the HSPF model to runoff from these soils, so in the absence of better information, these soils have been grouped as till soils. Most alluvial soils are classified by the SCS in hydrologic soil groups C and D.

Outwash Soils

Outwash soils are formed from highly permeable sands and gravels. The principal SCS soil group classified as an outwash soil is the Everett series. Where outwash soils are underlain at shallow depths (less than 5 feet) by glacial till or where outwash soils are saturated, they should be treated as till soils for the purpose of KCRTS application.

Wetland Soils

Wetland soils have a high water content, are poorly drained, and are seasonally saturated. For the purposes of applying KCRTS, wetland soils can be assumed to coincide with wetlands as defined in the critical areas code (KCC 21A.24).

The approximate correspondence between SCS soil types and the appropriate KCRTS soil group is given in Table 3.2.2.B (p. 3-25). If the soils underlying a proposed project have not been mapped, or if existing soils maps are in error or not of sufficient resolution, then a soils analysis and report shall be prepared and stamped by a ***civil engineer*** with expertise in soils to verify underlying soil conditions.